Worksheet to Identify Potential Indicators for Ecological Monitoring

You return to visit your park in 20 years and walk through the park with the current resource manager. The manager tells you about the current condition of the natural resources, the management issues, and threats of the day. What would that person describe to you?

Hopefully an improved situation on current issues, eg., exotic plants reduced, but program more on monitoring. Charismatic megafauna will still be an issue. Expanded bison range perhaps by 150%. Effects of climate change on resources. Perhaps some boundary expansion and/or mini-ranchettes adjacent to the boundary. Hopefully having a better understanding of inverts. More B&Bs around park. Perhap minor increase in visitors with new expectations. State promoting more businesses with emphasis on tourism. Air quality degradation due to PRB, and perhaps even Rapid City. Hopefully 100% of the burnable acres will be burned. Railroad may be in operation with associated impacts and development. Hopefully good integration with science and outreach. Greater symbiotic relationship between Forest Service and Park Service. Expansion of the prairie dogs will be an issue.

What are the park's most significant natural resources (e.g., the river and its tributaries, caves and cave fauna, rare plant communities, elk herd)?

Fossils, they are the reason the park was made. Grazing animals for ecological reasons and because of visitor interest. Mixed-grass prairie ecosystem. Clean air and silence. Prairie dog communities. Night sky. Geologic resources.

What does your park contribute to regional biological diversity (e.g., what natural resources are preserved and protected at your park that are altered or threatened throughout the rest of the region)?

Swift fox present. Large prairie dog complexes (along with the grassland). Relatively unaltered native prairie, including one that experiences fire. Ferrets. Semi-free ranging herd of bison with genetic integrity.

What park-specific legislative mandates direct the park to monitor a particular natural resource at your park.

Conserve fossils for research and benefit of public. Class I airshed so mandate to monitor air. Wilderness mandate. Scenic vistas in enabling legislation.

What federal and state-listed threatened and endangered species are known to occur in the park?

Ferret, prairie dog is candidate, bald eagle. State listed plants, butterflies such as regal fritillary, Dakota skipper, and a fish, swift fox, mountain lion.

What is that status of your park's management plans?

GMP is in development. RMP needs updating with new orders. Fire plan by early 2004. Weed management plan is approved. Wilderness plan in preliminary draft. Comprehensive Interp plan done in 1999. Bison and sheep plans in draft. Collection mgt. Plan done in 98.

What is currently being monitored at or near the park by NPS or other entities (e.g., plants by fire effects program, plants by LTEM, exotic plants by exotic plant teams, birds by Breeding Bird Survey, butterflies, stream by USGS, Christmas bird count, weather data, NRCS photography, visitors by park staff, state roadside counts --- use the checklist below)?

Air: IMPROVE station. Also measure ozone and particulates. Should be adequate to monitor from PRB but State disagrees. Will be testing to see if adequate to monitor Wilderness.

Amphibian: No although some surveys by Brian Smith.

Birds: Christmas bird count. BBS route in park that Eddie does. Systematic burrowing owl monitoring.

Fire: Has fire effects monitoring.

Fish: Aaron creel surveys. None.

Geology: No active monitoring although paleontological work, especially in regards to theft and enforcement. Should be monitoring for condition of paleontological sites – don't currently meet WASO expectations.

Mammals: *Bison herd size and genetics. Does ground counts annually typically just before cull. Swift fox (for near future using telemetry), ferrets, and prairie dogs (using transects for abundance). Bighorn sheep population and reproduction using telemetry.*

White River buildings mouse monitoring. State flies for antelope and in South Unit the tribe does a transect count for deer.

Meteorology: *Two fire weather stations for fire: Pinnacles and White River. NWS station at Ben Reifel.*

Pests: *Gypsy moth traps by White Ranger center and perhaps in campground. No captures yet. Lee is doing this.*

Pesticides *Records of use. Have done studies (such as CCC spring and School of Mines in groundwater) but no monitoring.*

Reptiles: *No systematic monitoring.*

Soils: No.

Sound: *Equipment was installed for 2 weeks to get baseline data for air tour management plan. Other studies were conducted previously (early and mid 90s).*

Vegetation: Response to pesticides thru EPMT. Area treated for thistle as part of EPMT mapping. Fire Effects plots in burn units.

Visitors Annual visitor survey in July. Counts at entrance stations. Visitor observations at key access.

Visual Landscape: *No established photo points. Has air quality visibility information.*

Water Quality: *Periodic studies but no monitoring other than drinking water.*

Wildlife or Plant Disease: *Brucellosis and TB for bison as part of culls. Do necropsies when available. Testing coyotes for plague, distemper, parvo as part of ferret/swift fox work.*

What are the stressors on park resources? What are the sources of each stressor?

Exotic plants. Drought. Pesticides both internal and external (at CCC spring atrazine was found). Bio-control for thistle. Fire suppression. Visitor impacts (erosion on travels, displacement of wildlife, sound, feeding wildlife, spread of exotics). Energy development in PRB. Hunting and grazing in South Unit. Gathering of plants in South Unit (sage). Grazing distribution (eg., lack of grazing in east side of park). Park size and boundary. Changing land use around park if there's more development. Domestic sheep or elk farm.

What potential management actions in the future may require monitoring (e.g., potential species reintroductions, land acquisitions, commercial uses)?

Trail rides and effects on trail systems. Rails-to-Trails along 44. Air tours and associated sound. Land acquisitions (in GMP).

What would your partners like you to monitor?

Neighbors want to monitor and conserve swift fox, ferrets, prairie dogs, grasshoppers (when an issue). State wants an IMPROVE station for air quality. State wants monitoring of swift fox. Noxious weeds (thistle, little bit of knapweed).

What current research is occurring at the park (research differs from monitoring in that it is typically of shorter duration, say 2-3 years)?

To numerous to list – see Permit web page.

Vital signs are: 1) sensitive enough to provide early warning of change, 2) have low natural variability, 3) can be accurately and precisely measured, 4) have costs and effort of measurement that are not prohibitive, 5) have monitoring results that can be interpreted and explained, 6) are low impact to measure, and 7) have measurable results that can be replicated with various personnel. Off the top of your head, look into your crystal ball and choose several vital signs to monitor over time to track the condition of natural resources within your park (items can range from broad, e.g., the stream, to narrow, e.g., a particular species). What are those vital signs? Rank them in order of importance.

1. Plant community (composition and diversity) with emphasis on native species and in relationship to fire and grazing. South Unit could be split out if needed due to funds. Should include woody draws as a vegetation type.
2. Some type of range monitoring in regards to grazing (perhaps stratify by different units).
4. Secondary invasions of exotics after treatment.
5. Periodic monitoring of rare plants.
6. Small mammals in response to fire
7. Lepidoptera. Mainly in response fire.

Birds in certain habitats or with special habitat needs.
Soil chemistry contingent on current studies.
3. Air quality effects on lichens.
Water Quality.
Fossils
Soundscape
Viewscape
Visitor impacts such as compaction to trees in campground and around visitor center